

DEFENSE SCIENCE BOARD

TASK FORCE

**Preserving a Healthy and Competitive
U.S. Defense Industry to Ensure our
Future National Security**



Final Briefing

November, 2000

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Task Force Membership



Task Force Members

Mr. Phil Odeon (Chair)	TRW Inc.
Dr. Gordon Adams	George Washington University
Mr. Michael Bayer	Army Science Board
Dr. David Chu	RAND Corp.
Mr. Nelson Gibbs	OMB
Mr. William Howard	Private Consultant
Dr. Steve Kelman	Harvard University
Mr. Bob Murray	CNA
Mr. Frank Sullivan	Frank Sullivan Associates
Mr. Peter Teets	Private Consultant
Dr. Dov Zakheim	SPC International

Government Advisors

Mr. Stan Soloway	DUSSD (Acquisition Reform)
Mr. Jeff Bialos	DUSSD (Industrial Affairs)
Ms. Carol Covey	Office of Defense Procurement

Interviews/Meetings/Presentations



Defense Industry

Boeing
BTG
CACI
General Electric
L3
Litton
Lockheed Martin
Northrop Grumman
Raytheon
TRW

Investment Community

Bear Stearns
CS First Boston
Deutsche Bank
Merrill Lynch
Chase Manhattan

Government Officials

DCAA/DODIG
DCMC
DUSD/Acq. Reform
DUSD/Industrial Affairs
ODUSD/Procurement

Trade Associations

Aerospace Industries Association
Electronic Industries Association
Professional Services Council

Other

BAE Systems
Booz-Allen & Hamilton
Corning
Heidrich & Struggles
Hughes Electronic
JSA Partners

Terms of Reference



Our future national security needs require a strong industrial base to provide technologically excellent weapons and equipment at affordable prices. This in turn requires a competitive defense marketplace with financially sound companies that are able to attract excellent technical and management talent. To this end, the Task Force should:

- Review DoD acquisition policies/regulations governing suppliers of military equipment.
- Determine - have these policies/procedures/regulations supported or weakened rational/economical business practices? Have they supported or weakened the technology capabilities of the defense industrial base?
- Recommend near term remedial actions that can be implemented unilaterally by DoD or via legislation.

Goal: To ensure our warfighters in the future have the weapons and equipment they need to prevail in a conflict quickly, decisively, and with minimal casualties.

Briefing Agenda



- I. The Challenge facing the Department of Defense
- II. The State of the Traditional Defense Industrial Base
 - Current Problems/Challenges
 - Future Problems/Challenges
- III. Task Force Findings
- IV. Task Force Recommendations
 - Ensuring technical excellence
 - Restoring financial and competitive vitality
 - Transitioning to the new paradigm
- V. Concluding Thoughts
- VI. Background Material
 - Defense Industry Concerns with DoD Policies/Processes
 - Wall Street Concerns with Defense Industry



The Challenge Facing The Department of Defense

DoD must ensure that our military has access to and benefits fully from the cutting edge technologies, human capital, and robust industrial and technology base that is necessary to meet the nation's national security needs.

Meeting that challenge in a very different 21st century industrial environment requires that the Department:

- Respond aggressively to the reality that the Defense industrial and technology base has undergone a fundamental change over the past decade. DoD traditionally relied on a largely defense-unique industrial base comprised of dozens of suppliers and technology leaders. In the future, the Department must increasingly access the commercially driven marketplace, in which the Department competes with other business segments for technology, investment, and human capital.



The Challenge Facing The Department of Defense (cont.)

- At the same time, the Department must maintain a competitive and healthy defense-focused industry that increasingly plays the role of the integrator of technology in an environment of increasingly complex “systems of systems.”
- Thus the defense industrial base is in essence entering a new paradigm, an era of rapid technological change (often commercially driven) smaller production runs and fewer new starts and an increasingly international business base. In this era, new ways of doing business are imperative.

The issues of greatest concern to the DSB panel, relate not to the profitability of defense companies per se, but, rather, the additional policy, practical, and cultural changes needed to enable DoD and its critical technology suppliers to provide best value solutions for America’s fighting forces and taxpayers.



The Challenge Facing The Department of Defense (cont.)

Although some companies are currently struggling, the DSB does not believe that the traditional defense industry is an industry in crisis. However, DoD's failure to acknowledge and address the changed industrial reality could in time place the Department and its primary suppliers, in a precarious position with regard to technology and people. The result of that failure will manifest itself in the quality and superiority of America's fighting forces and systems in the future.

At the same time, it is clear that some of the problems currently facing the traditional defense industry are within the power and responsibility of the individual companies to address. Nothing in this report should be construed as diminishing that fact.

With these challenges in mind, there follow a series of findings and policy recommendations, designed to ensure technological excellence, best value solutions, and the continuation of America's military superiority.



The State of the Traditional Defense Industrial Base

- Today the traditional defense industry is in a transition that is still incomplete. Many companies face challenging problems.
 - There are few opportunities for growth unless one takes market share or expands exports (in the face of tough competition and excessive export controls).
 - Profitability, already low compared to other industrial companies has declined. In addition, some companies have encountered problems on major programs, further reducing profits.
 - Cash flow, long a strength of the defense industry, has weakened for most companies (a factor in the sharp drop in returns).
 - As a result of consolidations, some companies have added to their debt, creating higher debt/equity ratios which result in lower credit ratings.
 - Market capitalizations of defense companies have suffered significant losses even beyond those of most other “old economy” companies.



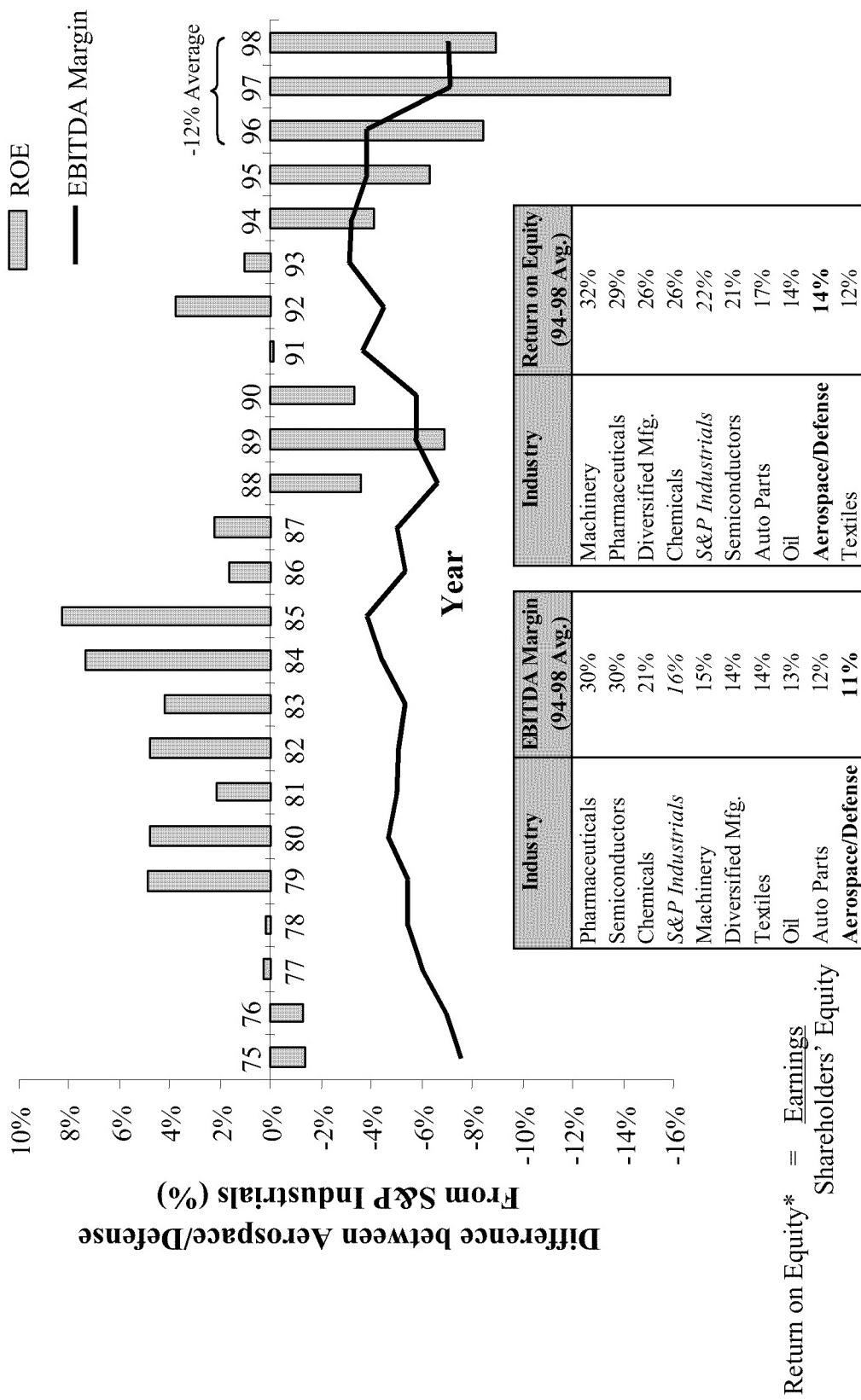
The State of the Traditional Defense Industrial Base (cont.)

- Innovative R&D across the sector is in decline.
 - > DoD funded R&D spending is flat.
 - > IR&D is down 50% from mid-80s and is increasingly directed by the government to support on-going programs.
- R&D profits are sharply constrained by the Cold War approach to “get well on production” that is no longer viable in an era of few large production programs.
- Key personnel are leaving or retiring and recruitment and retention of high quality technical and management people is very difficult.



Aerospace/Defense Financial Performance vs. S&P Industrials, 1975-1999

Over the past 25 years, Aerospace/Defense profit margins have been consistently low; however, ROE* appeared relatively strong until 1987.





The State of the Traditional Defense Industrial Base (cont.)

- This defense industry transition caused by the end of the cold war is complicated by the development of the “new economy” and poses serious challenges to the leadership of both industry and government.
 - Defense companies are competing for resources -- human and financial -- with new economy companies. The technical and management skills critical to defense are also key for new economy companies which was not true in the past.
 - A number of leading technology and industrial companies have exited the direct defense marketplace.
 - The remaining defense-focused companies are competing for fewer new major programs, limiting their growth potential and making each new program a “must win.”
- A healthy, competitive and innovative industry meeting defense needs must be more closely integrated with the commercial market to exploit the technologies flowing from the new economy – a new paradigm for this industry.



The State of the Traditional Defense Industrial Base (cont.)

- The investment community has serious concerns about the defense industry at a time when the equity market rewards growth, strong cash flow and predictability.
- The growth generated by consolidations in the mid-1990's is now seen as temporary and largely over.
- Equity values are down sharply and price/earnings multiples below that of other industrial sectors, resulting in a dramatic drop in market capitalizations of defense companies.
- The debt ratings of several large companies verge on junk bond levels (they probably would not be investment grade if they were not in the defense sector).
- Moreover, the defense customer is seen as capricious and unreliable and the management of the defense industry as having failed to successfully manage the rationalization process.
- The charts that follow illustrate the equity market reaction to the financial issues facing the defense industry.

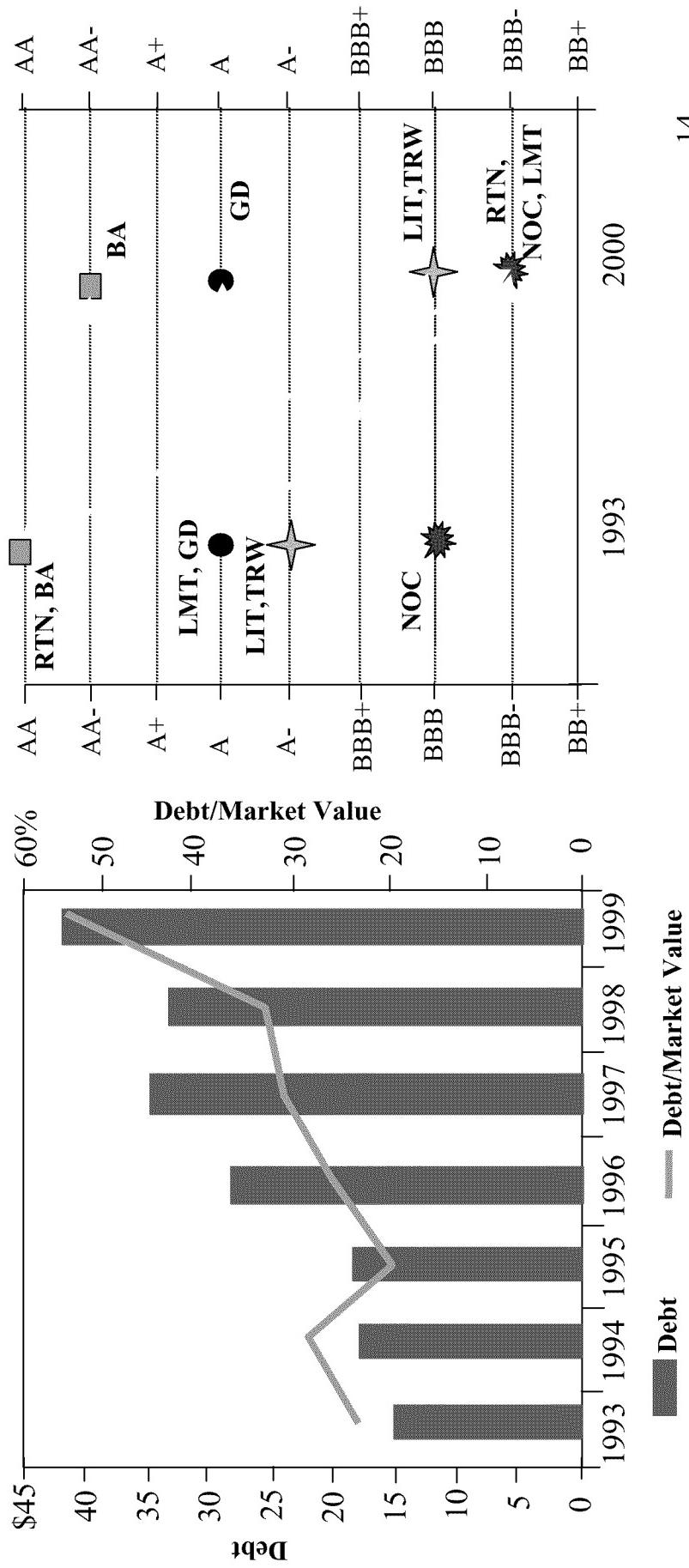


Increased M&A Activity Resulted in High Leverage

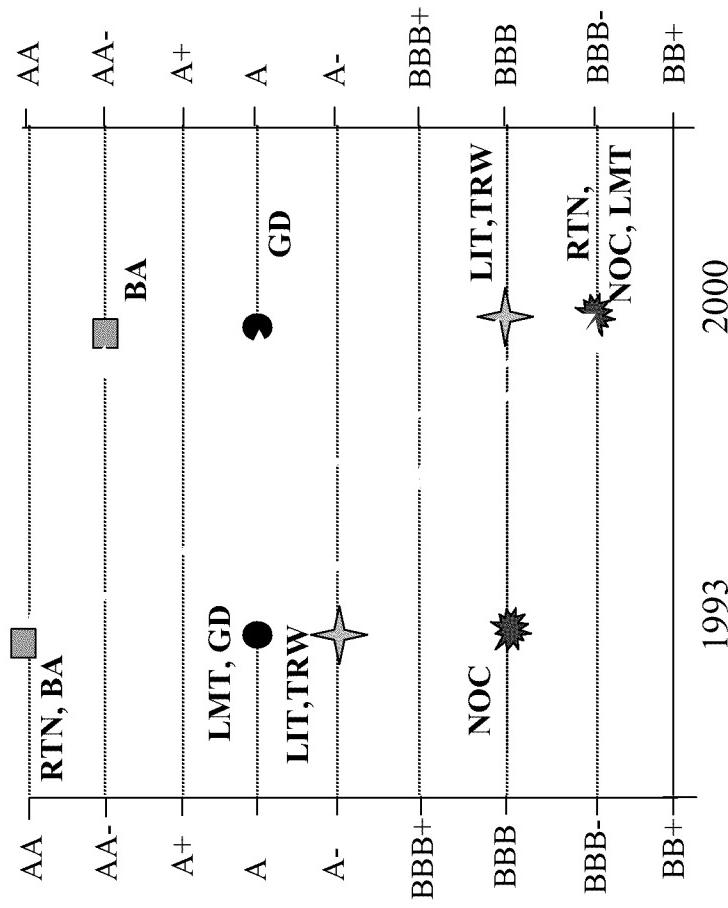
“Defense industry consolidation is expected to have a neutral to negative effect on the credit quality of merging firms Ratings prospects at individual firms will depend largely on deployment of free cash flows in an industry with constrained business prospects.”

---Standard & Poor's Credit Week, August 19, 1998

Defense Industry --Total Debt and Leverage⁽¹⁾



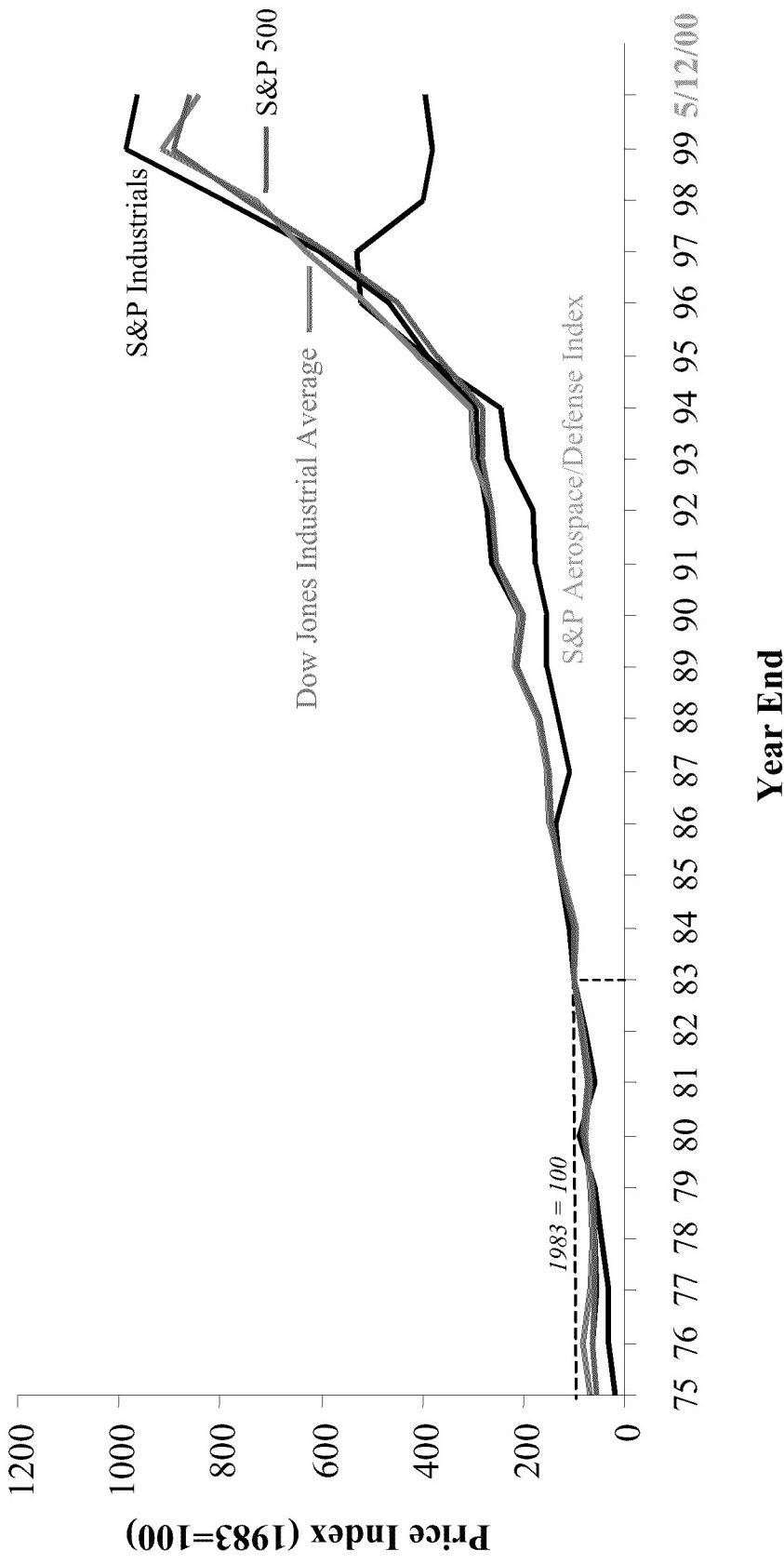
Defense Industry -- Credit Rating⁽¹⁾





Aerospace/Defense Stock Price vs. S&P Industrial Average, 1975-1999

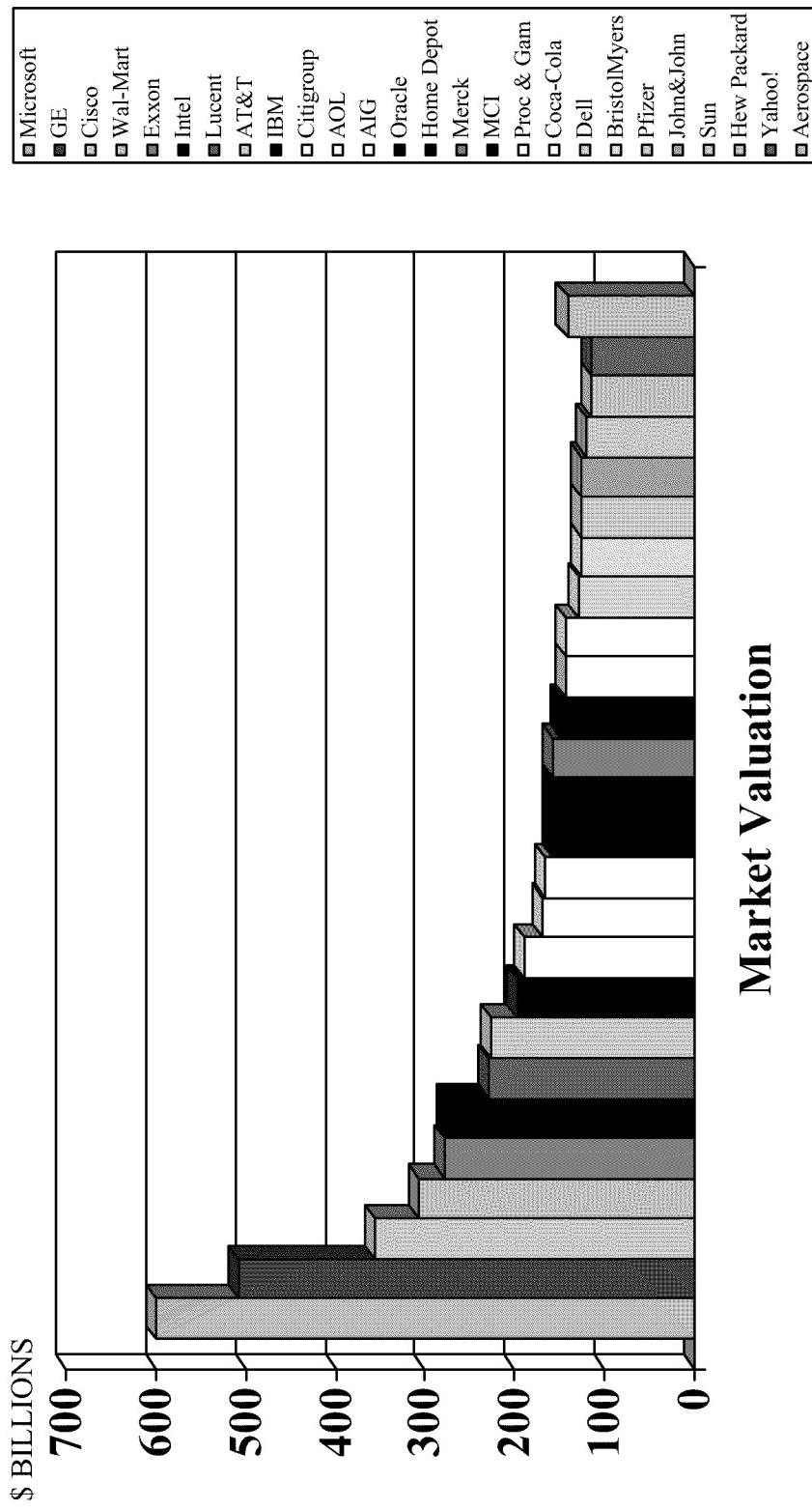
Aerospace/Defense stocks slightly under-performed the Industrial average until 1995. The decline in stock prices since 1996 is dramatic when compared to the steady gains of other industrial indexes.



Source: S&P, Dow Jones, JSA Analysis



Comparison of Aerospace Market Valuation to Top 25 U.S. Companies -- End of CY 1999



AEROSPACE includes: the total capitalization of Boeing, Honeywell, UTC, General Dynamics, Textron, Lockheed Martin, Raytheon, TRW, Northrop Grumman and Litton Industries.

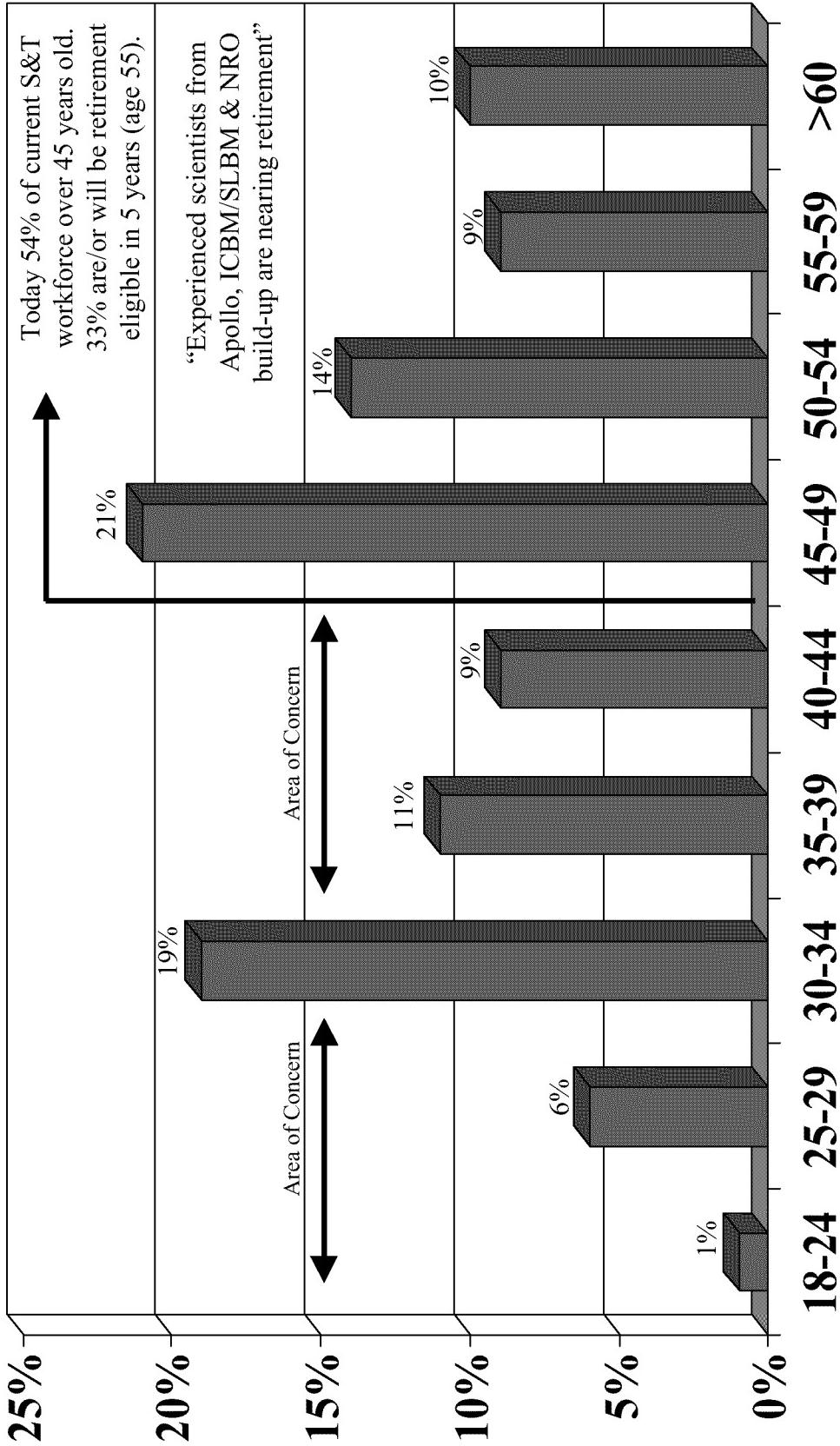


The State of the Traditional Defense Industrial Base (cont.)

- The industry faces very difficult human resource issues competing with new economy companies that have been exacerbated by the sharp drop in stock prices.
- The workforce is aging and large numbers of key technical and management talent will be retiring over the next 3-5 years.
 - Booz, Allen & Hamilton space study reports that one-third of the technical workforce is within five years of retirement eligibility.
 - The next generation of senior managers (age 45-55) will come from a relatively small pool of talent (now 35 to 45).
 - Major platform companies face equally serious problems.
- Recruitment is difficult -- for both new and experienced management and technical talent.
 - Share of top engineering school graduates going to defense industry is down sharply.
- A mid-level brain drain is also a major concern given defense companies' limited growth prospects and sharp declines in stock prices.
 - Technical talent in their 30s and 40s are not “locked in” by retirement programs.
 - The best people within defense companies often migrate to non-defense work.

Following Chart Illustrates The Workforce Age Concern

Average Space Industry Science & Engineering Workforce Age Distribution



Source: Booz, Allen, Hamilton (1999)



The State of the Traditional Defense Industrial Base (cont.)

- There are other technology challenges ahead as well that could undermine the U.S. Military technical edge.
 - Critical information/telecommunications technology is largely driven by non-defense companies and is readily available to potential adversaries.
 - S&T/R&D spending is declining, as is company-funded research (including independent research and development (IRAD)).
 - Consolidations resulting in vertical integration could put smaller companies at risk, financially and technically.
- Despite the need to exploit commercial technology and reforms to facilitate access, broader business trends add to the challenge.
 - Many companies have sold their defense specific business, including some of our foremost technology and industrial companies (see following chart).
 - Other defense companies merged to create larger, in some cases more vertically integrated companies focused primarily on defense and aerospace.
 - Many defense companies seek to reduce their reliance on defense - e.g. Lockheed Martin on Telecom, Boeing on Space/Telecom, and GD on Commercial Air.



Companies Exiting the Direct Defense Market

High Technology Companies

- California Microwave
- GTE
- Hughes Electronics
- IBM
- Lucent
- Magnavox
- Phillips
- Texas Instruments

Industrial Companies

- Allegheny Teledyne
- Chrysler
- Eaton
- Emerson
- Ford
- General Electric (except jet engines)
- Tenneco
- Westinghouse

Government rules cause other technology rich companies (e.g. HP, 3M) to decline to participate in critical research and development projects, though they will sell commercial products to DoD.



Why Companies are Leaving the Direct Defense Market

The Defense industry became unattractive through a process like the death by a thousand cuts. There was no one event that made the business unattractive but eventually things were screwed down so tight that it was no longer providing attractive returns. Moreover, the business no longer provided attractive cash flows and a company could no longer get cash up front for a large project. The government took all the savings from any operational improvements so that many capital investments would have had a negative return to the company had we employed the capital to achieve them.

Source: Senior Executive of a company that exited the defense market

Task Force Findings



American defense technology and equipment are the world's best, but the defense industry is in the midst of a fundamental transition.

1. Even after significant defense company consolidations :
 - Many defense companies have excess capacity and some companies have failed to take aggressive rationalization actions.
 - Costs remain high at a time of constrained budgets, which limits our ability to meet service modernization goals.
 - DoD policies do not adequately incentivize companies to make needed cost reductions and rationalization of facilities.
2. A new DoD industrial base paradigm is needed given today's defense acquisition environment.
 - There are fewer new major program competitions.
 - In the absence of long, profitable production runs to offset losses on development, so R&D must earn a reasonable return.



Task Force Findings (cont.)

- A revised acquisition front end (with more technology options explored prior to program commitment) requires that R&D programs be more separate from production
 - Access to commercial products, technology and productive capacity will grow in importance.
 - International markets for our products and access to technology from outside the U.S. will be needed.
3. The core technology base serving DoD today is sound, but its future viability and currency are at risk.
- Independent, innovative R&D is shrinking.
 - Defense companies find it difficult to attract high quality management and technical talent in a highly competitive marketplace (critical defense technical talent is also key for “new economy” companies). The current defense industry workforce is graying and key talent exiting.
 - Unless the DoD acquisition leadership considers the impact of its strategies early in major programs, the result could well result in sharply reduced future competition at both the prime and supplier levels.



Task Force Findings (cont.)

4. The national interest lies in a well integrated commercial and defense industrial and technology base; the Department must therefore focus its energies on achieving, not frustrating, that goal.
 - Barriers (intellectual property, cost data and related excessive penalties) deter commercial firms from providing defense specific R&D, products and services.
 - Leading technology and industrial companies have exited the defense specific market, severing the technology bridge between their commercial activities and defense needs.
 - There are numerous impediments to industry's ability to access and participate actively in the global marketplace, which is important to the long-term health, competitiveness, and growth of the defense industry.

Task Force Findings (cont.)



5. Despite improvement due to acquisition reform, the acquisition process continues to be overly risk averse, which inhibits innovation and access to creative, high technology solutions. Senior DoD leadership is focusing in the right direction, but the reality in the workforce (in government and to a degree in industry) is frequently different.
 - The acquisition workforce is under constant scrutiny and criticism and there is insufficient perceived support for calculated risks.
 - The oversight community, at the operating level, continues to function with an inadequate understanding for the realities and changing dynamics of the market or industry.
 - This environment inhibits creativity in the DoD industrial base and helps drive suppliers out of the DoD market.Moreover, senior military leadership and the PEO community have very limited understanding of the financial dynamics driving the defense industry or how their actions impact the industrial base.



Task Force Findings (cont.)

6. All defense focused companies are suffering from Wall Street's concerns about the industry: poor earnings performance by some companies, a defense "customer" seen as unstable and poor future earnings/cash flow prospects compared to other investments.
 - DoD policies and practices clearly contribute to some of the problems and inhibit solutions for others.
 - Some problems are the result of corporate miscalculations and/or program management problems.
 - The concerns of the investment community affect defense industry access to capital and complicate its efforts to attract and retain quality personnel.

Task Force Findings



Given these findings the Task Force recommends both short-term and long-term actions that support the following three objectives:

- Ensuring the continued technological excellence of defense weapons and equipment.
- Ensuring the future financial and competitive vitality of the defense industrial and technology base.
- Accelerating the transition to the new defense industrial and technology base paradigm.



Task Force Recommendations: Recommendations for Immediate Action

1. Revise policies and practices to enhance technical capabilities and access technical talent by removing barriers between the old defense and commercial industrial and technology bases — real civil-military integration.
 - A. Support industry's efforts to attract and retain top quality management and technology personnel by revising FAR guidelines related to cost reasonableness of recruitment and retention to ensure that they reflect current market conditions and personnel recruiting and retention practices in competing industries and regions.
 - B. In light of the new paradigm, DoD needs to develop and implement a new R&D business model that makes development work attractive to defense and other technology companies regardless of the likelihood of subsequent production contracts. This entails an R&D policy that:
 - 1) Disconnects possible future production contracts for R&D and eliminates “get well” incentives.
 - 2) Discourages the imposition of mandatory cost-sharing in R&D unless a compelling business case indicates otherwise.
 - 3) Uses incentives to drive positive performance, allowing excellent performance to yield significantly higher profit margins.



Task Force Recommendations: Recommendations for Immediate Action

- 4) Directs source selection authorities to use realistic cost estimates (e.g. use CAIG estimates to enforce cost realism).
 - 5) Directs the CAIG to aggressively develop new modeling capabilities to enable cost realism estimates on contracts that are not covered by cost accounting standards.
- C. Find new ways to expand the use of FAR Part 12 (commercial buying) for research and development.
- D. Facilitate the incorporation of commercial technology to refresh current weapons and equipment (e.g. expand COSSI, extend milspec/standards reform to legacy systems).
- E. Revise profit guidelines so that IR&D is fee bearing.



Task Force Recommendations: Recommendations for Immediate Action (cont.)

2. Ensure that the U.S. Industrial and technology base at the prime, sub, and component levels continues to be robust, competitive and technologically current.
 - A. Implement a policy requiring DoD acquisition managers to consider the effects of their acquisition strategies/plans/budgets on future competitions in important product markets.
 - B. In conducting major systems acquisitions, take actions to ensure the sub-system and component providers will continue to be able to provide competition and excellent technology.
 - 1) Consistent with current policy, oversee large development/production contracts to ensure Government continually obtains best value.
 - Revise profit guidelines to remove incentive to make rather than buy.
 - PEOs/PMs exercise required insight into the make versus buy process in major prime contracts and take action as necessary.
 - 2) Separately fund R&D on key components and sub-systems that are not an integral part of a major system

Task Force Recommendations: Technological Excellence



Long-Term Recommendations

1. Increase spending on R&D in areas designed to stimulate innovation in defense weapons/equipment technology and attract/retain top technical talent (commercial sector technology firms spend 15% or more of their revenues on R&D).
 - A. Increase front end S&T spending, e.g. 3% of top line budget for 6-1 to 6-3A program ramping up to 3.5% of the top line by FY2006).
 - B. Review DoD RDT&E infrastructure and funds allocation to eliminate duplication and redundancy and ensure that S&T spending is focused on most defense-unique basic research.
2. Increase investment in prototypes to provide a wider range of choice and maintain/strengthen design teams in critical areas of military technology.
3. To assist in attracting technical personnel, DoD should develop a marketing plan to highlight innovative research and development being performed within the defense community to the technical and educational communities.



Task Force Recommendations: Financial and Competitive Vitality

Recommendations for Immediate Action

1. Revise policies/practices to restore cash flow to traditional levels.
 - A. Return to the 1991 interest rate-based progress payment guidelines, that would set progress payments at 85%. Hold at that level pending a review of guidelines (keep small/disadvantaged businesses at 90% and 95%).
 - B. Extend the subcontractor cost billing policy (elimination of the paid cost rule) to cover existing as well as new contracts (ensure subcontractor payments are not affected).
 - C. Accelerate process improvements to speed contractor payments.
 - 1) Implement new automated systems.
 - 2) Enforce current policy to sharply reduce number of Contract Line Item Numbers (CLINs) and Accounting Classification Reference Numbers (ACRNs).



Task Force Recommendations: Financial and Competitive Vitality

Recommendations for Immediate Action (cont.)

2. To reduce the cost of weapons and equipment, provide incentives to cut costs and reward those companies that achieve significant savings.
 - A. To encourage aggressive cost reduction programs (including further rationalization):
 - 1) Share savings with industry (value engineering program is a good model).
 - 2) Revise profit guidelines to reduce the reward for fixed assets and add a factor to reward contractor cost efficiencies.
 - B. Focus and train the government workforce on commercial-style incentives and strategies (share in savings, award term contracts, etc.).
 3. Create an environment where high performing companies can achieve returns on capital comparable to commercial enterprises of similar risk and capitalization.
 - A. Vigorously enforce policies that prohibit DoD imposition of cost caps on risky development contracts that in essence convert them to fixed price contracts (may require descoping requirements or fully funding programs).



Task Force Recommendations: Financial and Competitive Vitality

Recommendations for Immediate Action (cont.)

- B. Use independent cost estimates, past/historical performance, and other tools to ensure cost realism and minimize buy-ins where diminishing sources/competition appear likely.
 - 1) Aggressively use strategies including possible commercial analogs (review/scrub requirements; use of open architectures, etc.) and use results of those assessments in development of the acquisition strategy, conduct of the source selection, budgeting and planning, etc.
 - 2) Use incentive strategies to promote innovation and cost control/reduction
- C. Expand use of price-based acquisitions and performance milestone payments.
- D. Allow higher profit margins on successful defense contracts (e.g. excellent cost/schedule/performance, technical performance exceeding specification, etc.)
 - 1) Should reduce costs and/or enhance performance.
 - 2) Should enable defense industry to earn profits more comparable to other industrial companies.



Task Force Recommendations: Financial and Competitive Vitality

Long-Term Recommendations

1. Support programs to provide defense companies with stable revenue and cash flow.
 - A. Expand use of multi-year production contracts.
 - B. Continue efforts to outsource industrial activities.
2. Request the Treasury Department to complete the Long Term Contract Revenue Recognition study requested by Congress in the Technology and Miscellaneous Revenue Act of 1988.
3. Review progress payment guidelines to assess their validity and appropriateness given the new industrial paradigm and current business prospects.
4. Explore alternatives for to assist industry in financing rationalization within the defense sector.

Task Force Recommendations: New Paradigm



Recommendations for Immediate Action

1. To attract commercial technology companies to undertake DoD contracts, revise regulations and policies regarding company funded intellectual property/technical data so that DoD practices adhere to best commercial practices (i.e. recognize the value of intellectual property and negotiate rights for only those uses absolutely necessary).
2. Adopt key reforms in munitions export control policies and processes.
 - A. Provide special Canada-like exemptions for key allies that are willing to “level up” on security, and adopt strong re-export and end use restrictions in order to promote interoperability and close technology gaps with coalition partners.
 - B. Provide broader, more flexible licensing vehicles (“one stop” licenses of longer duration) for use with NATO and other treaty partners.
 - C. Regularly review the ITAR to ensure the list of items is current and kept to a minimum.
3. Implement change to FMS process to eliminate “double” negotiations.



Task Force Recommendations:

New Paradigm

Long Term Recommendations

1. An agenda for longer term reform should be developed for consideration by the next administration.
 - A. Full transition to the “new paradigm” in regulations and oversight.
 - B. Continued integration of the commercial and defense industrial and technology sectors to ensure DoD has access to America’s best technology and technical talent. Barriers include:
 - 1) Excessive reliance on cost based production contracts.
 - 2) Accounting for unallowables.
 - 3) Potential transfer of intellectual property rights to competitors.
 - C. DoD should study the impact of industry’s perceived risk of excessive civil and criminal penalties on the supplier base including access to commercial technology.

Task Force Recommendations:

New Paradigm

Long Term Recommendations (cont.)

2. Undertake an independent and comprehensive assessment of the DoD profit policy and actual profits realized on defense contracts to determine if the policy is consistent with the new paradigm
3. Consider establishing a not-for-profit pilot venture capital fund (e.g. CIA's In Q Tel) funded by DoD to support firms focused on highly innovative, challenging and independent technology projects benefiting DoD.
4. Expand efforts to minimize impediments for US aerospace/defense firms to compete internationally.
 - A. Exports and greater international partnering with industry in allied and friendly countries strengthen the US defense industry and facilitate interoperability and joint operations with allies.
 - B. Focus export controls on only the most critical defense technology (e.g. DoD's "Crown Jewels.")



Concluding Thoughts/Suggestions



Aggressive, near-term actions are required to reduce the risk that DoD's industrial and technology base will be weakened, less competitive and unresponsive to our defense needs.

- Failure to act now will delay badly needed changes by at least a year (and probably longer).
- Lack of action would further undermine investment community support and workforce morale.
- Fixing these problems is critical to our future national security.

We must preserve our technological advantage to ensure our fighting forces will continue to win quickly, decisively and with minimal casualties.



Background Material

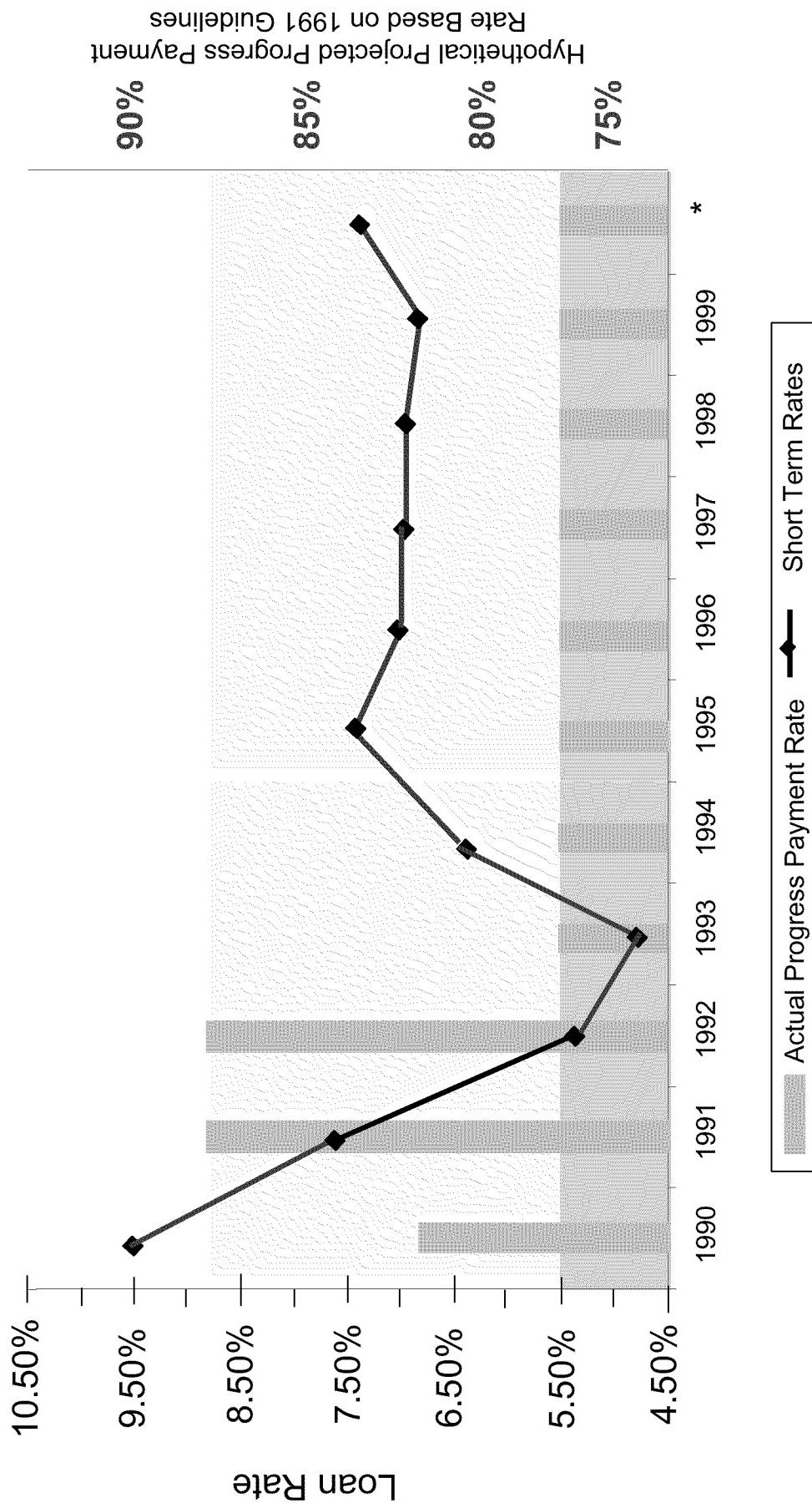
Industry Concerns With DoD Policies/Regulations/Practices



- With few competitions, the pressures to bid low are intense.
 - Major competitions are seen as “must win.” Result: thin margins/greater risk/overruns.
 - Government often imposes cost caps on cost type development contracts.
 - Government imposes (and industry accepts) production cost curves upfront, before development is complete which often prove optimistic.
- DoD practices put other pressures on profits.
 - Profit guidelines limit profits and often provide perverse incentives.
 - “Glass ceilings” on award fees and growing numbers of unallowables.
 - Limited sharing of savings from rationalization/cost cutting.
- Eroding cash flow while Wall Street focuses on cash.
 - Cash flow erosion due to earlier changes in progress payments and tax laws.
 - Payment process problems exacerbate cash flow problems.



Progress Payment Rates Indexed to Loan Rates



* Average of last three quarters of 1999 plus first quarter of 2000

Industry Concerns With DoD Policies/Regulations/Practices



- Flat R&D budgets and intense pressure on IR&D spending.
 - IR&D not fee bearing (true of all G&A).
 - IR&D may be used to support Section 845 transactions.
- Vertical integration may squeeze out smaller players.
 - Government Furnished Equipment (GFE) no longer the norm.
 - Merged companies have far broader capabilities.
- Profit guidelines encourage primes to make, not buy.
- International sales are constrained (export controls, FMS policy).
- Disconnects between reform-oriented senior government management and field-level staff (they “don’t get it”).
 - Field staff are risk averse; fear they won’t be supported.
 - Mind-sets such as the view that profit should be minimized.



Wall Street Concerns with Defense Industry

- Equity markets no longer support the aerospace “business proposition” and capital is flowing elsewhere.

Reasons:

Limited growth prospects in a growth-oriented equity market.

- Concerns about DoD (and Congress - e.g. F-22) as a customer.
- Too many negative surprises - they want predictability.
- Uncertainty about future revenues/profits/cash flow.
- Meager returns - the return on investment capital of some companies is below their cost of capital.
- Serious doubts about the management of defense companies.
- This is a significant shift in attitudes since the mid-1990's when defense companies outperformed the S&P 500.
- Multiples today are low even for industrial companies.



Wall Street Concerns with Defense Industry

- Depending on their business model, companies get support from the investment community for one or more of the following reasons:
 - Rapid growth in sales and profits.
 - High profit margins.
 - Strong cash flow (which usually means strong returns on investment capital).
 - Predictable results and meeting expectations.
- The loss of investor support for defense companies should be no surprise.
 - Growth prospects are modest and requires taking share.
 - Margins are relatively low and declining.
 - Cash flow, long a strong point, is diminishing.
 - Debt is high and interest costs are increasing.
 - Earning “surprises” are too frequent.
- Investors have many alternative, also cheap, investment options.

The Result - Depressed Prices and PE Multiples

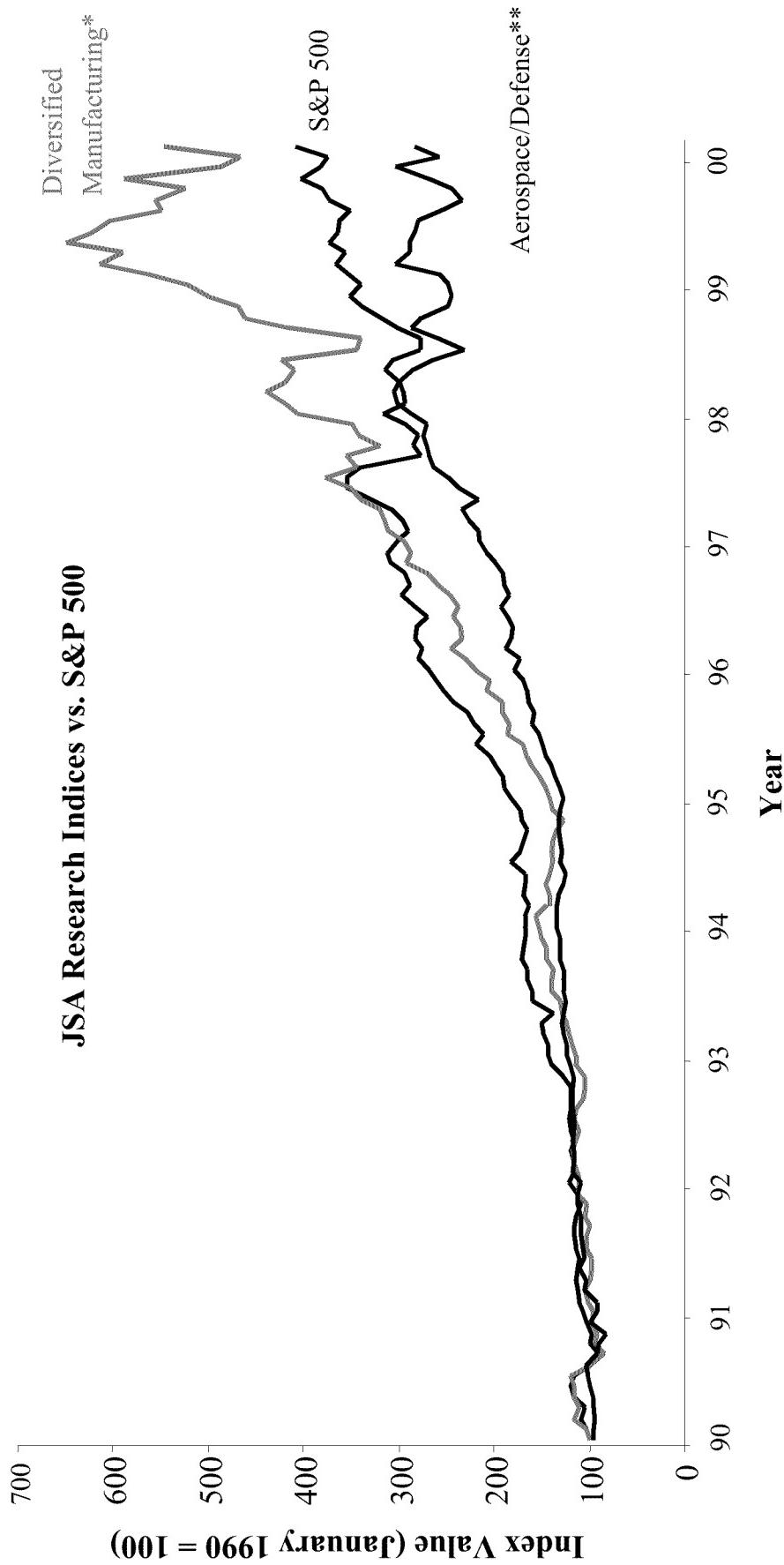


Wall Street Concerns with Defense Industry

- The implications of this loss of support are serious for the defense industry - and national security.
 - Difficulty in raising equity and debt capital.
 - Interest costs are higher and performance bonds/letters of credit more expensive.
 - Stock declines impact the workforce severely (drop in personal networth, retirement plans, underwater stock options).
 - Hiring new technical and managerial talent (both new graduates and experienced staff) is even harder.

This will not be Easy or Quick to Fix

Diversified Aerospace/Defense companies have outperformed both pure-play companies and the S&P index



* Diversified Manufacturing Index includes: Honeywell, Precision Castparts, Textron, and United Technologies

** Aerospace/Defense Index includes: AAR Corp, Alliant Techsystems, Boeing, BE Aerospace, Cordant, General Dynamics, Hughes Electronic Corp, B.F. Goodrich, Hexcel, Litton, Lockheed Martin, Northrop Grumman, Orbital Sciences, Raytheon, and Wyman-Gordon

Source: JSA Research, JSA Analysis



P/E Multiple: Aerospace/Defense vs. S&P Industrials, 1975-1999

Aerospace/Defense P/E multiples reflect overall market trends except for the 1995-99 period when there were wide swings from the S&P index

